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(54) Bags for liquids and their manufacture

(57) A recyclable, flexible plastics bag for carrying liquids and having a top spout 2 includes an intermediate plate 3 to which the spout is welded and which is welded to the bag body.

Tape 12 to form the plates 3 is fed past a punch 13, 14 which forms orifices 7, welding means 15, 16 which weld spouts 2 thereto at their rims (5, fig 3 not shown), wheels 17 which fold the tape backwards, and cutters 18 to provide individual plates 3. The plates are transferred by an arm 19 to moving strips 20, which have windows 21 formed by cutting and folding back a flap 22, and dies 24, 24', 25, 25' weld together the strips 20, flaps 22 and plates 3. The strips thereaft r receive peripheral welds and are cut to form the bags.

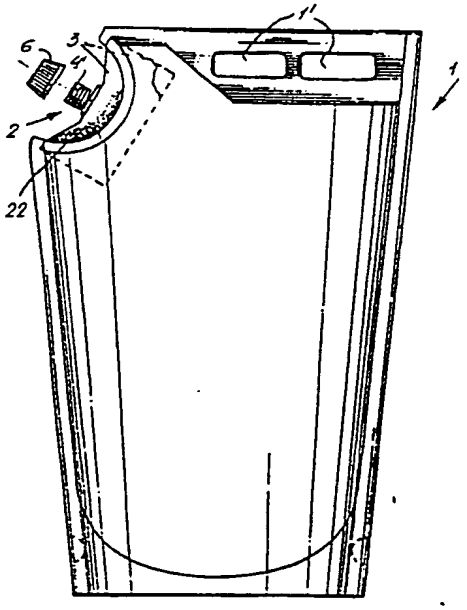

Fig.1

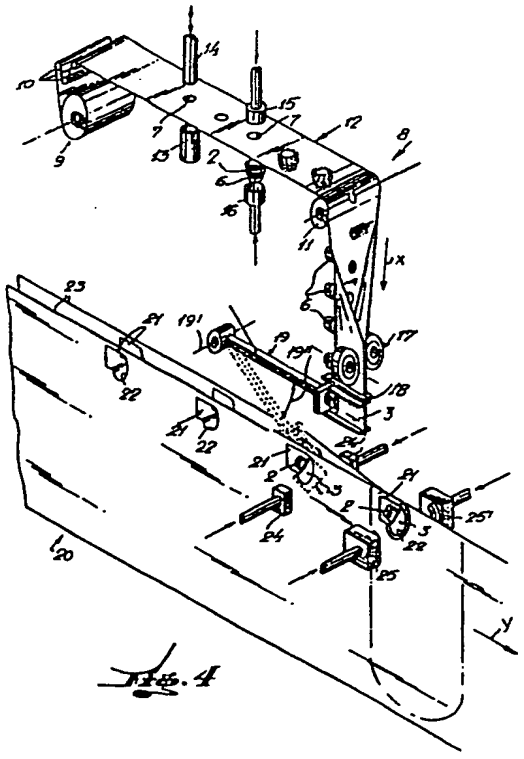

Fig.4

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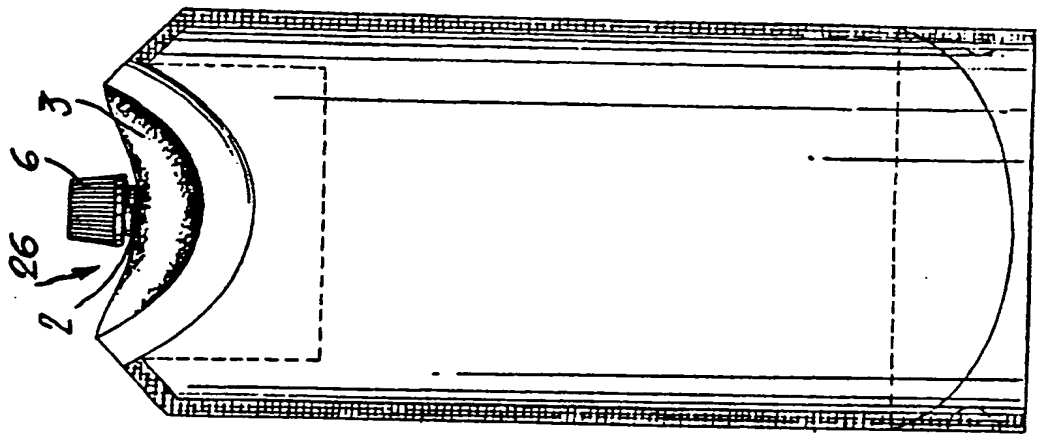

Fig.5

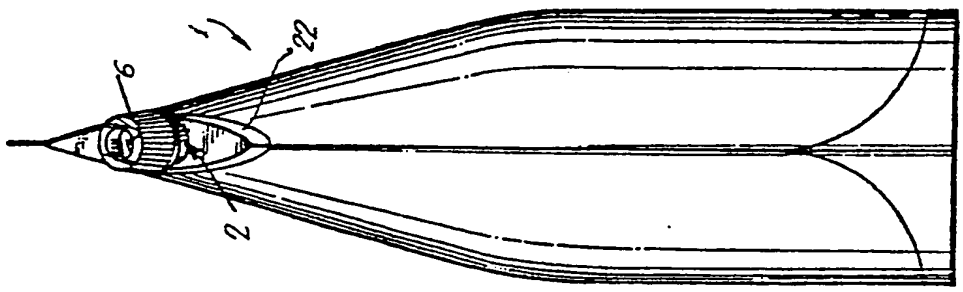

Fig.2

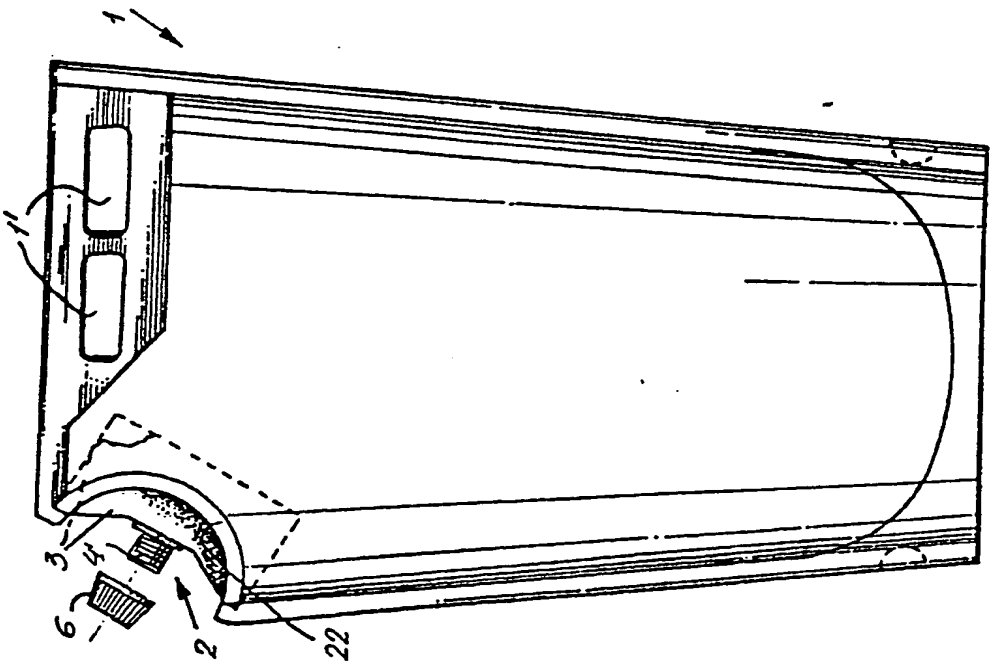

Fig.1

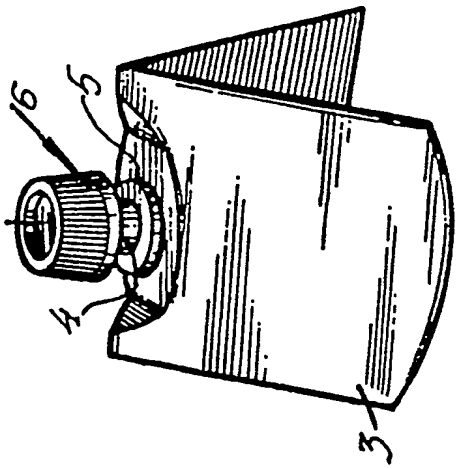

Fig.3C

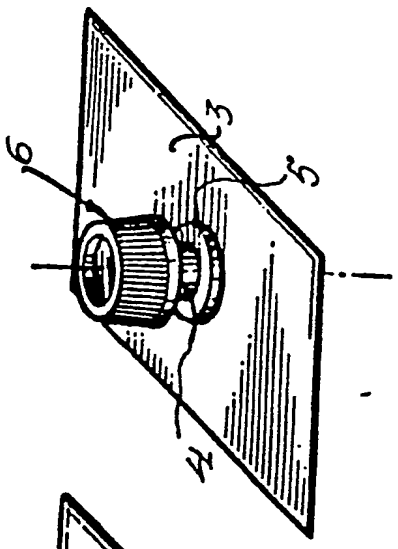

Fig.3B

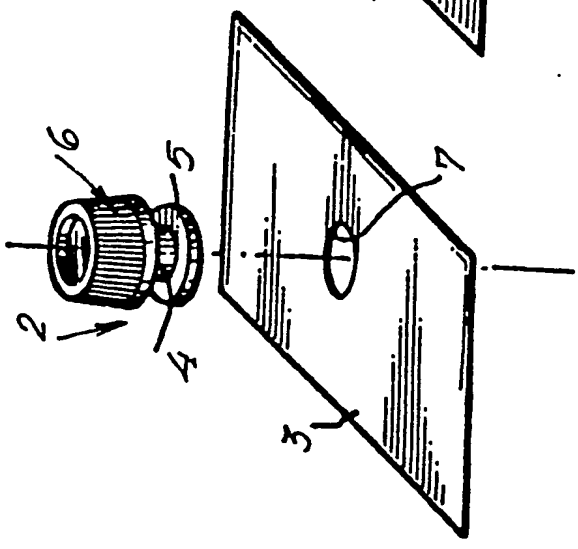

Fig.3A

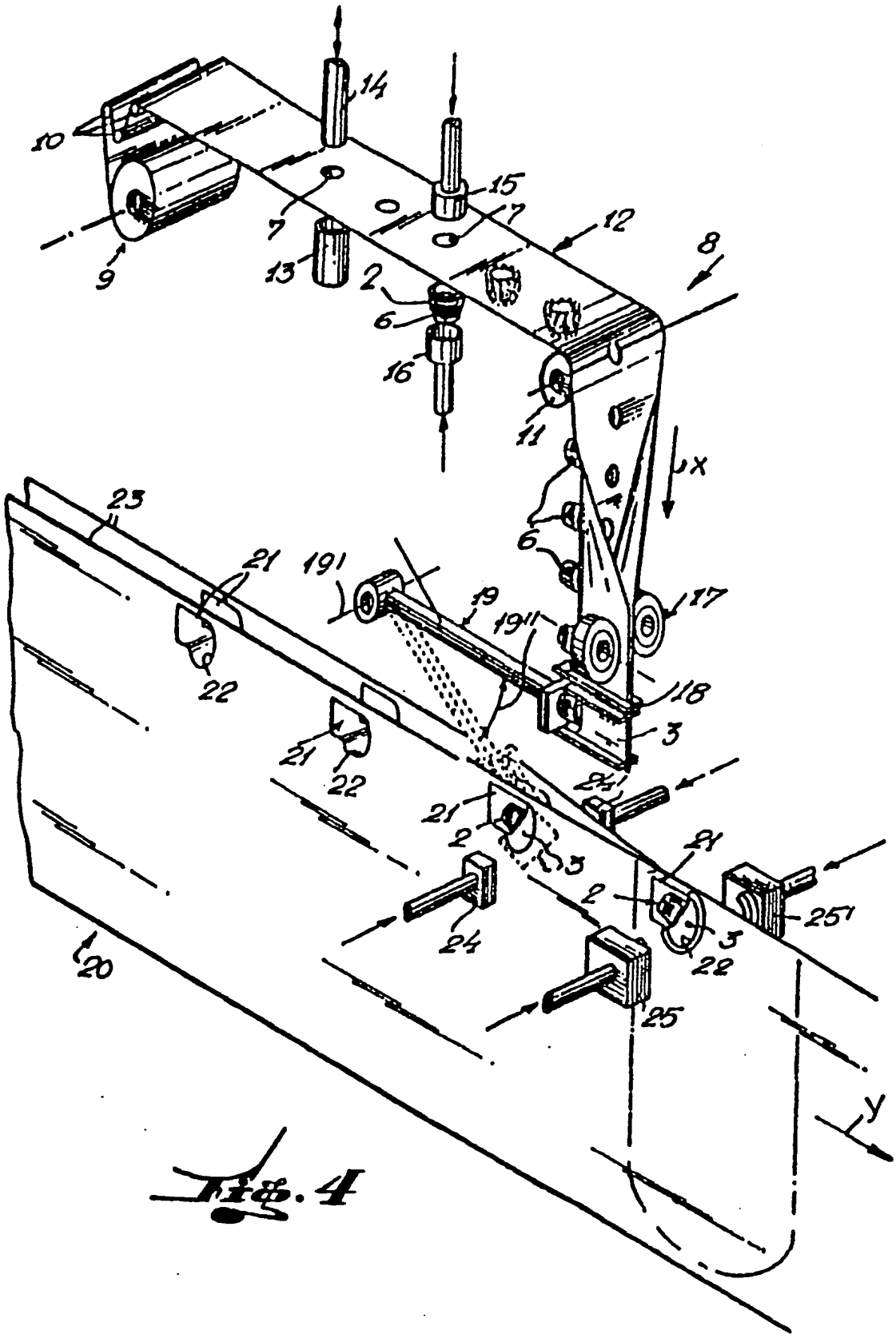

Fig. 4

BNSDOCID: <GB 2241487A>

CONTAINERS FOR LIQUIDS AND THEIR MANUFACTURE

The present invention relates to containers for liquids and their manufacture.

More particularly, it concerns a low-cost hand-held container and, also, a machine for serially manufacturing the container. Specifically, the container in question is of the type comprising a mass-produced, flexible bag-type container for a consumer product having a discharge nozzle or spout normally closed by means of a detachable cap. The cap may be of the snap-on type or, preferably, a screw-on top. The machine is fully automated, and manufactures containers quite economically and with a high production output rate, the container itself being of good quality, especially insofar as finishing, durability and structural resistance to bashes during transport, storage and use are concerned. In particular, the invention pertains to an economical, ecological, recyclable, flexible container made of plastics material, and relatively simple to manufacture.

Flexible plastics bags are usually used for disposable containers. Sometimes, a liquid product is sold sealed inside the bag-like container, which the consumer must rip open to use the product. This container may not be resealed and thus is of no more use and must be thrown away. Apart from the waste in the economical sense, this poses a problem regarding the waste in the ecological sense. Rubbish dumps are becoming scarce and environment control is one of the key issues in current affairs.

Other times, the flexible container is supplied with a spout for pouring, however heretofore the spout was necessarily joined to a flat part of the container, which is not always practical or desirable. For many applications, it would be d sirable to have the spout right on, i.e. not just somewhere near, the top of th container.

On the other hand, recyclable containers are generally manufactured from glass or hard plastics and with an integral spout right on the top, for example at a corner. However, the manufacturing process thereof is relatively slow, complex and expensive, involving the use of dies. Moreover, the resultant container, being rigid, uses a great deal more material and lacks some of the advantages found in flexible containers, such as lightness and foldibility.

Mass production of articles implies the use of energy, which is also at a premium nowadays. Speed, i. e. the output rate of a production line, is a concern too. The efficiency of an industry is dictated by both its energy consumption and its throughput.

In the light of the foregoing, it seems there is a great need for a recyclable, flexible, light plastics container using up less room and material and which may be mass-produced with relatively high machine output and low energy consumption.

An aim and object of the invention is to provide a container having a spout or nozzle on the top, similar to a conventional rigid container, but the container being of a novel and advantageous construction.

According to one aspect of the present invention, a container including a body for holding liquid contents and a spout or nozzle at the top thereof to enable pouring said contents is characterised by further including an intermediate member to which said spout or nozzle is fixed and which, in turn, is sealably joined to said body, whereby said body and said member form, in combination, a generally sealed container unit.

It will thus be appreciated that, in particularly preferred embodiments, the invention can:

provide a flexible, bag-like container, such that it is relatively light and may be folded so as to, for example, use up less rubbish space once dispensed with;

provide a recyclable container having a normally closed detachable cap on the spout, to avoid smelling and spilling of its contents; and

provide a bag-like container provided with holder means integrated therewith, to facilitate transport of the loaded container and pouring of its liquid contents.

According to other aspects of the present invention, there is a process for manufacturing an intermediate member for putting a spout on a flexible container, a process for manufacturing a flexible container having a spout located at a top thereof, and a machine for serially manufacturing containers having a flexible sheet-like body, a spout at the top and an intermediate plate member welded to said body and having said spout joined thereto.

The machine of the invention can be supplied with flexible thermosealable sheet material in coils for making the intermediate plates and the container bodies or bags.

A relatively narrow tape of this material is drawn out from a first coil, in which a hole is then cut and a spout tube fixed in place aligned therewith. The tape is then folded back, cut into a unitary plate member and conveyed thereafter towards and between two parallel moving sheets of the bag material previously drawn out from a second coil and adapted to receive the plate-and-spout assembly. The two sheets converge with the aforesaid assembly therebetween, where they are subjected to heat clamps to make the weld and, lastly, formed and cut into individual containers. The same material may be used both for the body of the container and the intermediate member, such as a thermosealable plastics. Moreover, the material may comprise a soft-plastics substrate having a layer of a thermosealable substance, such that the container body is manufactured with the thermosealable layer on the inside while the intermediate m mber is ass mbled with the thermosealable layer on th outside, such that the layers contact each oth r for w lding.

The invention will now be described in greater detail, but by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 shows a side view in elevation of a flexible bag-like container or receptacle with its discharge spout, shown with its cap off, according to an embodiment of the present invention;

Figure 2 corresponds to a more or less similar view of the same container shown from the front and full of liquid contents;

Figures 3A, 3B and 3C show the fundamental intermediate plate member of the invention, setting forth the sequence of stages or process for its manufacture;

Figure 4 shows a perspective and schematical view of the fundamental parts of the machine, according to an embodiment of the invention; and

Figure 5 shows a side view in elevation of a container according to another embodiment of this invention, having its spout placed differently from the one of Figure 1.

The bag, container or receptacle 1 of the invention comprises a body of flexible, collapsable sheet material. In order to facilitate carrying, the bag 1 may optionally feature a handle such as, for example, a set of holes 1' near the middle top for passage of fingers. The container 1 may be of the type used, for example, for marketing a variety of consumer goods, such as detergent, milk, oil, fruit-juice and the like. It features, as a primary characteristic of the invention, a discharge nozzle or spout 2 welded to an intermediate member 3 made from a flexible and thermosealable sheet. The member 3 may be a folded plate which, in turn, is welded to the container 1. Thus, the purpose of the intermediate plate 3 is to adapt the spout 2 to the body of the container 1, so that it may be joined to any desired part, including non-planar surfaces, thereof.

Preferably, both the body of the container 1 and the intermediate member 3 are made of the same, thermosealable

material. This material may comprise a plastics substrate coated with a thermosealable layer on the inside of the container body 1. In this regard, the material of the adapter member 3 is inside-out, that is the thermosealable layer is on the outside, such that respective layers are in contact where both elements 1 and 3 overlap so that they may be sealably welded together by applying heat in a suitable manner.

On the other hand, the spout 2 is of a rigid material, and comprises a cylindrical tube or tip 4, provided with a ring-like flange 5 at one end for heat-welding, as is explained later on, and a male screw thread 4' at the other end for adapting a detachable threaded cap 6, although the latter is by all means optional and may be replaced by any equivalent means or device.

The intermediate member 3 has an orifice 7 midwidth, facing which the tip 2 is set, as illustrated by the sequence of figures 3A and 3B, and joined in place by welding the rim of the flange 5 to the underlying plate 3. This member 3 is then folded back about 90°, as shown in the figure 3C, forming a pair of flaps practically touching each other, so that the assembly may be in turn, set and welded to any part, preferably the top corner, of the bag 1. Of course, the material of the latter is selected to resist the pressure and heat applied during the welding stage.

Preferably, the sheet material of the container 1 may in itself be comprised by two layers or sheets stuck to each other by means of a suitable commercial contact adhesive. The outside layer may be a 12-micron thick polyester (PET), chosen for its shininess and strength and because it does not soften below high temperatures. The inside lay r is made of a polyol fina such as lineal low-density polyethilene (LLDPE). Th thickness of the inside layer may be in the range of between 100 and 200 microns, depending on the siz of th contain r 1; typically 150 microns in the case of a one-litre container. In this way,

a container 1 of this size only weighs about 15 grammes, on which a cap 6 not weighing more than 2 grammes may be put, resulting thus in an attractive and light but resistant product, according to the invention.

It has been found that the containers of the invention are just as useful as rigid plastics containers and use up about 70% less plastics material, which represents a significant relief with regard to the problem of plastics in the environment. The container may be reused just like a rigid one or thrown away, in which case, unlike the rigid container, it may be folded so as to use up much less room.

Figure 4 shows the schematic of an automatic machine 8 and the process for manufacturing the spouted plate assembly 3-4 and the finished container 1. The sheet material for the plate 3 is drawn out from a coil 9 through a set of suitable rollers 10 and 11 in the form of a tape 12 moving along an assembly line. In between the rollers 10 and the roller 11, the length of tape 12 is first perforated by means of a punch 14 and its corresponding facing die 13 of the machine 8 for cutting the central orifice 7, and immediately thereafter the spout 2 is set facing the hole 7 and the rim 5 welded to the tape 12 with the aid of a hot clamp 15 and its corresponding facing saddle 16. The tape 12 of thermosealable material is conveyed by wheels 17 which fold the tape 12 backwards, slightly over 90°, as can be readily seen in figure 4. Thereafter, the machine includes a pair of cutters 18 which sever the tape 12 at regular intervals to provide each individual plate 3, already with its definite shape shown in figure 3C and its affixed spout 2, and a transfer arm 19 which pivots to-and-fro about an axis 19', as indicated by the arc 19", to transfer each intermediate plate 3 towards the container assembly line.

The container assembly line includes coil means (not shown) which supply a pair of parallel, evenly-spaced strips 20 of flexible, thermos alable she t material. Windows 21 are formed at regular intervals near the top

edge 23 of each of strip 20 by cutting three sides of an approximate trapezoid and folding back the resulting unsevered flap 22 about 180°, using state-of-the-art - cutting and folding techniques (not illustrated). The strips 20 are advanced at an intermittent speed so as to stop at the very instant and position where the transfer arm 19 can place the ready plate 3 in the gap between both strips 20. The arrows X and Y show the forward direction of the tape 12 and the strip 20 along their respective assembly lines. A pair of aligned dies 24-24' act first together and then alternatively to carry out a partial fixation seal of the sheets 20, flaps 22 and plate 3, which holds them all in place once the transfer arm 19 pivots back upwards letting go of the plate 3 and the strips 20 are conveyed onwards again. Thereafter another pair of aligned dies 25-25' finish this sealing operation so that the spout 2 is now firmly sealed to the container. A marginal or perimetral weld of the strip 20 is then carried out and properly finished, and the strip unitarily cut to produce the final shape of the bag 1 having a pouring spout 2, according to the present invention.

Apart from the already discoursed objects and benefits of the invention, it has been found that the energy required to manufacture the container of the invention is about a third of that currently used for a plastics bottle and half that for a glass container, of about the same size. Furthermore, it has been found that this machine has an output of about 5,000 containers per hour, as against approximately 2,000 articles per hour achieved with the manufacture of traditional containers of the type referred to hereinbefore.

Figure 5 shows another container 26 embodying the principles of the invention. Its main features are similar in gen ral to those of the container 1 (figure 1), xcept that the spout 2 is placed in the middle of the top part of the container 26 such that the latter is symmetrical. Only minor modifications are necessary in the machine 8 (figure

4) to adapt it to the different location of the windows 21 and the intermediate member 3 relative to the container body sheets 20.

CLAIMS

1. A container including a body for holding liquid contents and a spout or nozzle at the top thereof to enable pouring said contents, the container being characterised by further including an intermediate member to which said spout or nozzle is fixed and which, in turn, is sealably joined to said body, whereby said body and said member form, in combination, a generally sealed container unit.

2. The container of claim 1, characterised in that said body is of flexible, collapsable material.

3. The container of claim 1, characterised in that said intermediate member is made of a flexible, thermosealable plate material, said container body is made of a flexible, weldable sheet material, and said member is joined and sealed to said body by means of weld applied on a perimeter surrounding said spout or nozzle.

4. The container of claim 3, characterised in that said container body is formed of a pair of sheet strips and said member has a pair of opposite edge portions folded back and located inside of said sheet strips.

5. The container of claim 3, characterised in that said spout or nozzle comprises a substantially cylindrical tube having a ring-like flange at an inner end thereof, said intermediate member having a substantially central orifice facing said inner end of the tube, and said flange has a rim welded to said member.

6. The container of claim 5, characterised in that said tube has a detachable cap on an outer end thereof opposite said inner end.

7. The container of claim 3, characterised in that said container body and intermediate member are made of the same thermosealable material.

8. The container of claim 7, characterised in that said material comprises a plastics substrate having a layer of a thermosealable substance thereon, said body having said

layer on the inside and said member having the thermosealable layer on the outside.

9. The container of claim 1, characterised in that said substrate is a sheet of polyester about 12 microns thick, and said layer is of a polyolefina material between 100 and 200 microns thick.

10. The container of claim 1, characterised in that said spout is fixed to a generally non-flat surface of said body.

11. The container of claim 1, and further including holder means comprised of orifice means adjacent a top edge of said body for passage of fingers.

12. A process for manufacturing an intermediate member for putting a spout on a flexible container, characterised in that said process comprises the steps of:

conveying a strip of tape material drawn out from a coil of flexible thermosealable material and successively performing the following steps thereon;

punching substantially central holes at regular intervals of said strip;

setting a spout tip facing each central hole and heat-clamping it in place to weld the spout to the strip material;

double-folding the moving strip longitudinally back about 90° to form a pair of symmetrical longitudinal flaps nearly meeting each other at opposite longitudinal edges of the strip; and

cutting the tape into individual strip members having one spout joined centrally thereto.

13. A process for manufacturing a flexible container having a spout located at a top thereof, said process characterised by comprising the steps of:

conveying a pair of parallel, evenly-spaced strips of sheet material;

cutting a pair of holes facing each other near the top edge of each sheet, the material of said holes forming

unsevered flaps which are folded back about 180° onto the sheet material;

transferring individual plate members having a spout joined centrally thereto and a pair of flaps folded back about 90° therefrom;

positioning each plate member in between said pair of conveyed strips such that the flaps of said member are sandwiched between the flaps of the pair of strips;

welding the plate member to the pair of strips in the forementioned position; and

sealing and cutting the pair of strips into individual spouted containers.

14. The process of claim 13, characterised in that the welding step is carried out by clamping the pair of sheets together and simultaneously applying heat.

15. A machine for serially manufacturing containers having a flexible sheet-like body, a spout at the top and an intermediate plate member welded to said body and having said spout joined thereto; said machine characterised by comprising:

a first assembly line for assembling container bags from flexible, weldable sheet material;

a second assembly line for assembling intermediate plate members each with a corresponding spout and shaped for assembling into a container bag; and

transfer means for timely transferring individual assembled plate members from the end of said second assembly line onto said first assembly line.

16. The machine of claim 15, characterised in that said second assembly line comprises:

conveyor means for drawing out lengths of plate material from a coil of flexible, thermosealable material, punch means for cutting holes at regular intervals midwidth of said plate material;

clamp means for setting individual spouts facing each hole and joining them to the plate material;

wheel means for folding lengths of plate material back about 90° to form a pair of flaps converging on each other from opposite edges of said plate material; and

cutter means for cutting lengths of plate material into individual plate members having spouts and ready to be transferred onto said first assembly line by said transfer means; and in that said first assembly line comprises:

means for supplying and conveying a pair of parallel, evenly-spaced strips of sheet material in the direction of said first assembly line,

means for partially cutting said strips to form pairs of facing windows and cut-away portions defining a pair of flaps on said pair of strips,

means for folding said flaps about 180° onto the respective strips,

means for clamping said strips together with an individual plate member received in therebetween via said transfer means from said second assembly line, said transfer means being adapted to position said member in correspondence with said pairs of windows and flaps,

first heating means for partially welding the plate member between said strips to keep it in place,

second heating means for definitely and sealingly welding said plate member to said strips, and

means for converging the conveyed strips, sealably welding the perimeter of each bag and cutting said strips into individual bags to produce finished containers.

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